ABSTRACT: This paper has two main sections, the first of which presents a summarized review of the literature concerning previous studies on the implementation of ISO 9000 quality management systems (QMSs) both in global construction companies as well as in Indonesian construction firms, and the perceived correlation between organisational culture and QMS practices in the construction sector. The first section of the paper contributes to the development of the second section, which presents details of the research project being undertaken. Based on the fundamental questions that led to the development of the main research objectives, suitable research methods have been developed in order to meet these objectives. Primary data will be collected by use of a mixed methods approach, i.e., questionnaire surveys and focus group discussions/interviews in order to obtain opinions from respondents drawn from targeted ISO construction firms. Most of the data expected to be obtained will be in future be analyzed using statistical software then the findings will be discussed in order to ultimately develop a culture-based QMS framework.

Keywords: Quality management system, organisational culture, Indonesian construction, qualitative research methods.

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BACKGROUND

The quality management systems (QMSs) currently being implemented by Indonesian constructors and builders, are based on the ISO 9000 series of standards, and are becoming increasingly important to customers who have developed a growing aspiration to procure qualified and professional construction firms, capable of meeting their specification requirements and giving better customer satisfaction through successful project delivery.

However, there appears to be a substantial gap between the goals of ISO 9000 and what actually happens in practice on construction and infrastructure projects in Indonesia. Although purportedly operating QMSs certified to ISO 9000, Indonesian construction firms appear to have obtained their certification just to demonstrate that the companies actually have a management system, and that they can be deemed capable of producing quality project delivery. In other words, they are often using the certification solely in order to have eligibility for undertaking bidding and procurement activities, particularly on government sponsored projects. The mere existence of QMS documentation such as quality plans, procedures and work instructions in companies head offices does not align with the deep-rooted operational practices and procedures needed for the ultimate deliverable of well-operated QMSs which is to achieve customer satisfaction and focus, in other words the espoused values of ISO 9000.

To date, much research has been conducted into QMS implementation and its advantages to stakeholders, both internal and external, of construction projects. However, only limited research has been carried out into studying whether the deep-seated corporate cultures of companies influence and are absorbed into, the QMS practices and how this impacts on quality system outputs, both generally within the construction sector and specifically in the Indonesian construction industry. The successful implementation of an ISO certified QMS, requires a total change in organisational focus even to the extent of adopting a new culture that must be focused on achievement of greater customer satisfaction and improvement in operational processes at all levels of the company. Effective QMSs and strong corporate culture are mutually bound together as is evidenced by the failure of many companies, not strongly committed to continuous improvement and ultimate customer satisfaction, being unable to implement quality practices and achieve quality outcomes.

This paper describes exploratory research being undertaken with the major aim of ultimately establishing a framework for assisting Indonesian constructors and builders in preparing, developing and applying effective QMSs to enable better control of processes and management of projects, as well as delivering greater customer satisfaction. Prior to the collection of data required for this research project, a literature review has been undertaken focusing on QMS implementation in construction companies globally, as well as more specifically in Indonesian construction firms. This review has also examined how a company’s ‘strong’ organisational culture profile can actually improve construction outcomes and organisational effectiveness when operated in conjunction with proper QMS implementation (Coffey 2005, 2010; Yong and Low 2008).

LITERATURE REVIEW

ISO 9000 Quality Management System (QMS)

It is generally true to say that in the construction industry globally, the purpose of every construction firm is to win over customers’ trust and acknowledgment as a means of gaining greater business competitiveness and for making greater profit. The ISO 9000 series, developed by the International Standards Organisation (ISO) is a standard related to implementing better quality management, control and assurance in companies (Chini and Valdez 2003) and is already widely accepted in many manufacturing, production and services industries because it focuses on customer focus, leadership, people involvement, process approach, systems approach, continual improvement, and promotes a factual approach to decision making (Turk 2005; Tricker 2008). The standard is actually a generic one and because of this is not confined to those industries mentioned but can also be used successfully by construction companies on their projects, even though every project is unique and involves different sub-contractors and suppliers.

Effectively implementing a quality management system, espousing quality values or adopting a high-level quality philosophy, whether it is by virtue of operating an ISO 9000 QMS, or by applying a TQM approach, potentially provides benefits that are needed by any construction company. Low and Wee (2001) claim that by employing an ISO 9000-certified QMS, work repetition, project delays and failure to meet specifications can be minimized. Other advantages are that the buildability factor of most projects can be increased whilst the project cost is decreased because of the use of an appropriate framework for controlling the processes required when constructing the project. In
support of this view, Ofori et al. (2002) point out that lessons learned from implementing a QMS ensure that a construction company can be more efficient in its subsequent projects using material resources, developing better internal communications and increasing productivity as well as improving its standard operating procedures. The primary benefit of operating an effective, appropriate and transparent quality system is that a construction firm will be admired and chosen to bid in both local and global market contracts (Yates and Anifós 1997; Ofori et al. 2002; Turk 2005). All this evidence leads to a conclusion supporting and recommending that a QMS needs to be developed and fully implemented in any construction company that wishes to be a sector leader.

However, a number of researchers in the area of QMS implementation opine that ISO 9000 is not an appropriate standard for use in construction firms. For example, Landin (2000) in studying the Swedish construction sector argues that ISO 9000 is difficult to be applied by construction companies because its clauses are too general and the nature of construction projects, practices, contracts and specifications are somewhat unique and specific in every case, and usually they provide different specific product and service outcomes to be enveloped under a generic system such as ISO 9000. Quazi et al. (2002) make the point in their study of the Singapore construction sector there is evidence to suggest that ISO 9000 certified companies actually do not provide qualified products and services. In addition, Turk (2005) notes that the development of an ISO 9000 certified QMS, requires a huge amount of written documentation and needs a long time to integrate with a company’s management system, leading to a substantial increase in operating costs. Therefore, these contrary views on the issue bring up the burning question of why is it that some construction companies cannot effectively empower their organisations to establish successful QMS arrangements and others are successful in implementing a QMS?

The Existing Use of ISO 9001 in Indonesian Construction Firms

For the past decade, the Indonesian construction sector has had the intention to promote the development and implementation of quality management systems (QMSs) amongst its various players. The regulations issued by the Government indeed contain recommendations for all types (i.e., grades 2 – 7) of registered construction service providers to establish their own quality standards and determine their responsibilities to the public as well as to service local and global market needs. SNI 19-9001:2001 (ISO 9001–2000) for establishment, implementation and operation of a bona-fide QMS is recommended by the Ministry of Settlement and Regional Infrastructure and the Head of Construction of the Investment Development Board, as the quality standard to be implemented by all grades of Indonesian constructors (Menteri Perumukiman dan Prasarana Wilayah Republik Indonesia 2004; Kepala Badan Pembinaan Konstruksi dan Investasi 2004). Thus, based on the ISO 9001 requirements, every firm should develop its QMS including establishing full and auditable quality documentation.

In order to assure the consistency of constructed project quality, private project owners have also required their preferred contractors to operate a formal quality system as a guarantee of raising quality standards at all project stages and to ensure that project operations are based on proper quality planning. The system preferred by the Indonesian National Builders Association is ISO 9001 (Gapeksindo 2007). The Association further states that construction firms which intend to bid for projects must have an ISO 9001 certified QMS and this requirement is valid both for government and private projects.

Data obtained from National Construction Services Development Board (LPJK 2009b) shows that there are 139,634 construction companies in Indonesia consisting of 124,971 in grades 2-4 (small scale), 13,750 in grade 5 (medium scale), and 913 in grades 6-7 (large scale). A report released by the Board (LPJK 2009a) also notes that the total number of the ISO 9001 certified construction firms was 305 as of November 2008. Compared to the percentage of construction companies holding ISO 9001 certification in other countries, Singapore 7.1%, China 11.4%, UK 8.8% (ISO 2004 in Turk 2005), Indonesia possesses just about 0.22% of all construction companies already certified.

However, there still appears to be some doubt amongst other Indonesian construction firms surrounding the whole concept of QM practices. An example of poor quality outcomes in Indonesian projects is depicted in the Body of Construction Development and Investment (Bapekin) report, which states that in the previous Pelita VI road infrastructure project a financial loss of 7.68 trillion rupiahs accrued because of a serious deviation in project quality (Andi and Chandra 2007). These authors (ibid 2007) also provide some real examples of other quality problems, e.g., a 50% reduction in road infrastructure’s planned-life, 6% in total damage to completed road works and 7% in road-medium break-down.

Clients have serious questions concerning unsatisfactory work quality and project outcomes from
Asahan Tanjungbalai, North Sumatera Province did not receive government projects totaling 9.15 billion rupiahs in 2009 coming from some local government officials. Five newspapers have depicted complaints from Indonesian contractors. Articles obtained from the province, as the project owner, as well as the recipient of the projects, have been improperly carried out (Pontianak Post Online 2006, Radar Banten 2007). The South Sulawesi Province Government has also issued complaints to a construction company undertaking a flyover project in Makassar because of the delay to the project that has caused serious traffic jams (Media Online Finroll 2009). Similarly, North Sulawesi Province, as the project owner, as well as the recipient communities, have addressed their complaints to one contractor relating to significant project delays and poor performance on the Soekarno Bridge in Manado (Komentar 2009) The main issues arising from such complaints indicate a level of concern regarding the current state of ISO 9001 and QMS implementation, and raise the major question as to how these systems can be effectively applied in the actual day-to-day practices adopted by Indonesian contractors and builders and maintained throughout the lifecycles of projects as well as spread throughout the whole organisational culture of the companies concerned.

Discussion of the issue as to why QMSs cannot be effectively applied by some constructors and builders is very limited in the extant literature, however, Novessro (2009) states that the 10 root-causes of ineffective ISO 9001 implementation are:

- Obtaining of ISO certification just for prestige;
- Lack of top management commitment;
- Minimum availability of supporting resources;
- Failure in applying continuous improvement concepts;
- Unrealistic timelines set up for rolling-out QMS programs;
- Failure in disseminating QMS programs to all organisational levels since it is assumed that the system is only appropriate for manufacturing processes;
- Unsuccessful human resources training with regards to becoming an agent of change;
- Unsuccessful definition and design of QMS documentation;
- Implementation of QMS is only allowed as an add-on to standard operating procedures; and,
- QMSs are applied without conducting a comprehensive review of existing management system.

According to Andi and Chandra (2007), to cope with the problems, the Indonesian Government through the Ministry of Public Works, as a mandatory quality controller, has been trying to work out solutions for construction companies by applying a greater roll-out of human resources training, for examples, holding seminars and discussions of quality awareness themes in order to motivate local contractors to properly implement ISO 9001 certified QMSs. In addition, in 2005, the National Construction Services Development Board, in cooperation with the Department of Public Works, released Guidelines for Quality Management Implementation (ISO 9001:2000) of Construction and Consultant Services. The guidelines consist of key sections explaining the planning and implementation of QM systems and quality documentation, and also provide samples of works instructions. However, despite all of these efforts, there has been little positive evidence of improved quality output (Andi and Chandra 2007). This raises a serious question, “why should this be?”

The Correlation between Organisational Cultures and QMS

The term ‘organisational culture’ to date has many different definitions given by authors and researchers. By adopting definitions from a number of sources, Coffey (2005, 36) writing about the culture of construction companies adopts the following definition as “.....the informal shared values, norms and beliefs that control how individuals and groups in organisations consistently performs tasks, solve problems, resolve conflicts and interact with each other and with others outside the organisation.”

Various studies have been undertaken analysing how a quality system can be successfully implemented and in identifying the benefits to be gained by organisation, that achieve this. Gare (1999), Corbet and Rastrick (2000) and Irani et al. (2002), all agree that there is a definite correlation between corporate culture and successful quality in construction projects and it is noted that the nature of that culture is a major determinant factor for such success and that is in turn related to the successful implementation of a QMS. Yong and Low (2008) have referred to this relationship as “mutually reinforcing” and by this they mean that if the corporate culture is good, the quality system will be applied appropriately so the products and services will be good too.

Maull, Brown and Cliffe (2001) suggest that construction companies should have a preliminary review of their internal culture before attempting to introduce TQM, and according to Irani et al. (2002) construction firms should examine whether they possess
core values that focus on customer satisfaction and retention of such values continuously. These points are useful to consider in order to establish a clear view of what the fundamental culture should be for a construction company to possess or develop in order to win customers’ satisfaction and achieve business excellence.

Some of several management traits commonly used to describe the links between corporate culture and effective QMS implementation in construction organisations include process management, leadership and management commitment, and staff empowerment and effective communication. Zhang et al. (2000) emphasized that process management is the key element to guarantee project results that conform to specified requirements. The corporate culture needs to be embedded in a project’s process management through establishment of top-driven and high-quality project objectives and the desire for satisfying customers by meeting and even exceeding their requirements. Moreover, Everett (2002) in Mahmood et al. (2006) notes that, quality outcomes can be achieved even if there is only a strong commitment to improving quality and guidance from management on their expectations and requirements for quality. This means that management has responsibilities to create a comfortable workplace atmosphere to facilitate employees in conforming to specifications and delivering productive project results (Leiter and Maslach 2002 in Mahmood et al. 2006). An appropriate corporate culture also enhances a harmonic internal relationship amongst management and staff so that communication between them runs smoothly (Karathanos 1998). This is highlighted in clause 5.5.3 of the ISO 9001:2008, which notes that internal communication needs to take place to improve the effectiveness of the quality management system implementation.

Nevertheless, for a construction company to diagnose its current culture and then initiate change in order to develop a ‘strong’ corporate culture is not an easy task. Sandholm (1999) claims that it might be difficult for a company to alter its usual habits and behaviour to embrace a new ‘quality’ culture; it needs a lot of effort and extreme adjustment. Supporting this view, Lakhe and Mohanty (1994) conclude that in order to guarantee successful implementation of TQM there should be a total transformation of the corporate culture, restructuring of management responsibilities and a complete and long term involvement of all stakeholders for quality process improvement.

In the previous section, a summary of the extant literature covering the research problem was discussed, which concluded that there was an apparent ‘gap’ in terms of Indonesian construction firms’ implementing an effective QMS that meets customer requirements. In addition, it appears to be essential to study the relationship between organisational culture and these QMS practices to gain a better understanding of ‘why this should be’? However, the investigation of Indonesian contractors’ cultural profiles and how they influence the QMS implementation has not so far been researched to any great degree up to this point in time. The literature so far reviewed has led to some research questions.

1. How effective are the existing quality management systems (QMSs) currently being implemented by Indonesian construction companies? If there are some obstacles affecting the operation of quality system implementation, what are they?
2. How can the organisational cultures of Indonesian construction companies influence their quality system implementation?
3. How can effective QMSs be properly established, and so be effectively implemented and continuously improved by Indonesian construction companies?

Based on the research questions, the main research objectives are established, which will later drive the research process and these are:

1. To examine the effectiveness of the QMSs in Indonesian construction firms and to identify any current problems within the systems.
2. To assess the type and strength of the organisational culture of Indonesian construction companies and analyse the influence of organisational cultures on quality management system implementation.
3. To design and develop a framework for Indonesian construction firms to effectively implement a QMS designed to lead to better bottom-line outcomes, and to evaluate the usefulness of such a framework in practice.

Research Method

The research project will utilize a mix of quantitative and qualitative methodologies. The quantitative approach is considered appropriate to achieve the first
and second research objectives, whilst the qualitative approach is used to deal with the validation of the practicality and usefulness of the research findings (the third research objective). As for the data collection, a survey questionnaire and focus group interviews will be employed. Following the data collection, results from the survey questionnaire will be analysed using basic descriptive statistical and inferential statistics methods in which most of the data will be computed using statistical software SPSS version 18, and the focus group results will be analysed using qualitative software QSR NVivo version 8 for MS Windows. The questionnaire design and methods of data collection are specifically further described as follows.

**Questionnaire Design**

The questionnaire consists of a set of statements that examine current QMS practices in construction companies and identify the obstacles faced by those companies already certified (or in the process of certifying) to the ISO 9000 standard, and it also possesses some questions that help to determine factors that are viewed as influencing effective and continuous improvement of QMSs; all are primarily derived from the literature review. Questions are classified into closed-ended questions and open-ended questions. Since most of the questions seek opinions or a subjective measurement, the formats of such questions are based on a checklist, and/or a Likert rating scale.

For questions pertaining to organisational culture assessment, the organisational culture assessment instrument (OCAI) developed by Cameron and Quinn (2006) and based on the competing values framework (CVF) is utilized. In the OCAI, a respondent rates a set of statements that relate to six cultural dimensions, i.e., dominant characteristics, organisational leadership, management of employees, organisational ‘glue’, strategic emphasis, and criteria of success; the rating level is based on whether these dimensions are similar (or not) with the current situation in a respondent’s company. This instrument is used to identify the most closely fitting typology of a company’s culture, i.e., whether it is predominantly a hierarchy, market, clan, or adhocracy culture. This measurement tool has been used by numerous researchers in studying the organisational culture profile of many companies in various business sectors and has been proven to facilitate organisations to successfully change and improve their cultures. It was the instrument used by Yong and Low (2008) when they studied the relationship of organisational culture and TQM implementation in construction firms in Singapore, by Thomas et al. (2002) to compare the organisational culture with quality outcomes on thirteen Australian construction projects, and Nummelin (2006) also used this instrument to measure organisational culture in the Finnish construction sector.

In order to secure the enthusiastic response to this survey, the language used for the questionnaire is Bahasa, which was back-translated twice from the original English version by different translators who are both fluent in English and Bahasa (Fink 2009). Figure 1 (adapted from Coffey 2005) shows the flow of this back-translation technique used for the questionnaire.

According to Usunier (1998), this back-translation technique is advantageous to ensure that potential translation errors and discrepancies are minimized. In fact, the results from the translation process are that, there is not much difference between the two Bahasa versions. Hence, after comparing the second Bahasa version (B2) with the original English version (E1), and conducting resultant editing of the Bahasa version, the final version was established for piloting.

**Data Collection**

A preliminary pilot study is being conducted to validate the accuracy of the questionnaire statements/questions and to solicit comments and feedback on the techniques under consideration for collecting data in the main survey. A pilot study provides opportunities to test the wording of the questionnaire, and ensure that there are no ambiguous questions, the format of, and instructions contained in, questions are understandable by respondents and the data can later be easily analysed (Naoum 2008; Bell 2006).

The respondents will be drawn from 10 private construction firms that have the ISO 9001 certification in Manado, and 3 companies in Jakarta. In this preliminary stage, the respondents will complete the pilot questionnaire, which will be followed by an interview in order to obtain detailed feedback on the pilot study undertaken; interview questions will examine issues such as
usefulness, effectiveness, time spent, and will give an opportunity for additional input of any topics useful in improving the design of the main survey questionnaire. This pilot study will be conducted in the period between December 2009 and January 2010.

The feedback from the pilot study will assist in finalizing the format of the main questionnaire and prepare the ground for the main survey. The questionnaire survey will be mailed to respondents and is used to achieve research objectives 1 and 2. The survey method is suitable when a large amount of data is needed to be collected from people concerning their views and experiences of a particular phenomenon, and when time available to collect the data is limited (Fink 2009, Naoum 2008).

The sample population for the main study is drawn from ISO 9000 construction companies in the three capital provinces, i.e., Manado, Makassar, and Jakarta. The main reason for drawing respondents from the ISO certified construction firms and developers in these three cities is that they well represent the environment of the construction industry in typical small, medium, and large cities in Indonesia. This method of sampling combines random and non-random categories of data. A stratified random sampling method is used to select respondents representing a company, i.e., Quality Manager (QM), Project Manager (PM) and Site Engineer (SE). These groups also represent the high level (QM), middle level (PM), and lower level (SE) in the organisational structure. A simple random cluster sampling is used primarily to choose the location of designated construction companies. The total number of ISO 9000 certified companies in the three cities is about 200 companies in which these companies are part of the total 305 ISO 9000 certified construction companies in Indonesia. This constitutes a sampling rate of about 66 %. The results from this main survey will be analysed and discussed in order to develop a proposed QMS framework as one of the research objectives.

The second strategy applied to collect data in this research is to use focus group recorded discussions, which also satisfies the 3rd research objective. Use of a focus group is designed to communicate the proposed QMS framework as well as deriving opinions and judgment about the framework from specific audiences that are closely involved with the QMS application. The focus group method is valuable since it gathers homogeneous groups of professionals, experts or users to interact and exchange ideas and opinions freely, and at the end of the discussion, they may establish a consensus view on a particular topic (Fellows and Liu 2008; Rea and Parker 2005). Thus, in this research, the focus groups will be utilised in the three cities (at least one focus group for one city) and the members of every focus group will consist of five quality managers and five project managers from targeted construction firms. The data obtained from the focus group discussions will be recorded and analysed and the resultant analysis used to refine the proposed QMS framework.

Significance of the Research

This research can be considered significant in contributing to a deeper understanding and knowledge of QMS, particularly with regard to its development and effective implementation. The study will also enrich the extant literature with a contemporary perspective of the characteristics of organisational culture and QMS practices of construction companies in Indonesia. In addition, it is anticipated that the research findings should assist constructors and builders in Indonesia in measuring and understanding their own corporate cultures and hence initiating changes in order to successfully prepare, develop and apply more effective QMSs and quality processes and practices. The proposed framework to be developed from the research will further support the attempts to introduce ISO 9001 standard certification of QMSs to a wider base of Indonesian construction companies and to assist in a better understanding of the Indonesian construction quality management system regulations i.e., SNI 19-9001-2001/ISO 9001-2000, as these two requirements are recommended by government to be used by contractors engaged in small to large scale projects. Finally, the findings and framework will positively contribute as benchmarks to facilitate the Department of Public Works to implement its quality improvement and drive the demand for more widespread QMS implementation in the construction industry.

ACKNOWLEDGEMENTS

This research project is funded by DIKTI Scholarships on behalf of The Ministry of National Education of The Republic of Indonesia.

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